

WHAT IS CLAIMED IS:

1. A wavelength multiplexer/demultiplexer, comprising:

- a plurality of regions of optically permissive material each disposed adjacent one another in a side by side relationship in order to define a stratified body, the material in adjacent regions having differing indexes of refraction;
- said stratified body having a first surface and a second surface that are positioned in a non-parallel relationship with respect to one another, said first surface being a light-receiving surface, and said second surface being a light-exiting surface.

15 2. The wavelength multiplexer/demultiplexer defined in claim 1, wherein each of the regions has a respective face contacting a common substrate without contacting any adjacent one of the regions.

20 3. The wavelength multiplexer/demultiplexer defined in claim 1, wherein the plurality of regions are disposed side-by-side in a lengthwise manner, wherein each of the regions has a different respective length than any adjacent one of the regions.

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4. The wavelength multiplexer/demultiplexer defined in claim 1, wherein:

- each of the regions has a first free end and a second free end;
- the first free ends of the plurality of regions collectively define the light-receiving surface;
- the second free ends of the plurality of regions define the light-exiting surface.

5. The wavelength multiplexer/demultiplexer defined in claim 4,
wherein the light-receiving and light-exiting surfaces form
substantially straight lines.

5 6. The wavelength multiplexer/demultiplexer defined in claim 4,
wherein at least one of the light-receiving and light-
exiting surfaces is curvilinear.

7. The wavelength multiplexer/demultiplexer defined in claim 1,
10 wherein:

- the plurality of regions comprises a plurality of regions formed of a solid material and a plurality of regions formed of a non-solid material;
- each of the regions formed of a solid material has a first free end and a second free end;
- the first free end of each of the regions formed of a solid material collectively define the light-receiving surface;
- the second free end of at least some of the regions formed of a solid material define the light-exiting surface.

20 8. The wavelength multiplexer/demultiplexer defined in claim 7,
wherein the plurality of regions formed of a non-solid
25 material are formed of ambient air.

9. The wavelength multiplexer/demultiplexer defined in claim 8,
wherein the light-receiving and light-exiting surfaces form
substantially straight lines.

30 10. The wavelength multiplexer/demultiplexer defined in claim
8, wherein the light-receiving and light-exiting surfaces
are curvilinear.

11. The wavelength multiplexer/demultiplexer defined in claim 1, wherein:

- the plurality of regions comprises a first plurality of regions alternating with a second plurality of regions;
- each of the first plurality of regions has a substantially identical first width;
- each of the second plurality of regions has a substantially identical second width.

10 12. The wavelength multiplexer/demultiplexer defined in claim 11, wherein said first width is substantially the same as said second width.

15 13. The wavelength multiplexer/demultiplexer defined in claim 11, wherein said first width and said second width are distinct.

14. The wavelength multiplexer/demultiplexer defined in claim 1, wherein:

- 20 - each of the regions has a respective length;
- at least some of said regions have a width that varies over the length of the respective region.

25 15. The wavelength multiplexer/demultiplexer defined in claim 1, wherein at least one of said regions is curved along its length.

30 16. The wavelength multiplexer/demultiplexer defined in claim 1, wherein each of -said-regions-has a respective width that is less than the shortest wavelength of visible light.

17. The wavelength multiplexer/demultiplexer defined in claim 1, further comprising a cladding layer, wherein each of the

regions has a respective second face contacting the cladding layer without contacting any adjacent one of the regions.

18. The wavelength multiplexer/demultiplexer defined in claim 5 17, wherein the plurality of regions includes a first subset of regions formed of a first material, wherein said cladding layer includes a material substantially identical to the first material.

10 19. The wavelength multiplexer/demultiplexer defined in claim 1, the wavelength multiplexer/demultiplexer further comprising:

- a first collimating structure and a second collimating structure disposed on the substrate;
15 - the first collimating structure being adapted to collimate an incoming polychromatic optical signal towards the light-receiving surface;
- the second collimating structure being adapted to focus an optical signal received from the light-exiting surface 20 towards an outgoing optical waveguide.

20. The wavelength multiplexer/demultiplexer defined in claim 19, wherein one of the first and second collimating structures is a lens assembly.

25 21. The wavelength multiplexer/demultiplexer defined in claim 19, wherein one of the first and second collimating structures is a mirror assembly.

30 22. The wavelength multiplexer/demultiplexer defined in claim 1, the wavelength multiplexer/demultiplexer further comprising:

- a first waveguide for supplying an incoming polychromatic optical signal to the light-receiving surface;
- a plurality of second waveguides for receiving a plurality of outgoing wavelength component optical signals from the light-exiting surface

5 23. The wavelength multiplexer/demultiplexer defined in claim 22, further comprising:

- 10 - a plurality of first waveguides for supplying a plurality of incoming wavelength component optical signals to the light-receiving surface;
- a second waveguide for supplying receiving an outgoing polychromatic optical signal from the light-exiting surface.

15 24. The wavelength multiplexer/demultiplexer defined in claim 19, further comprising:

- 20 - a first waveguide for supplying an incoming polychromatic optical signal to said first collimating structure.

25 25. The wavelength multiplexer/demultiplexer defined in claim 24, further comprising:

- 25 - a plurality of second waveguides for receiving a plurality of outgoing wavelength component optical signals from said second collimating structure.

26. An optical device assembly, comprising:

- 30 - a polarization filter having a first port for carrying an optical signal having a first polarization and a second port for carrying a signal having a second polarization different from the first polarization;
- a first wavelength multiplexer/demultiplexer as per claim 21 connected to the first port;

- a second wavelength multiplexer/demultiplexer as per claim 21 connected to the second port.

27. The optical device assembly defined in claim 25, wherein
5 the first and second wavelength multiplexer/demultiplexers are on separate substrates.

28. A wavelength multiplexer/demultiplexer, comprising:

- a substrate;
- 10 - a plurality of regions of optically transparent material positioned adjacent one another in a side-by-side relation;
- adjacent ones of the regions having differing indexes of refraction;
- 15 - each one of the plurality of regions having a respective face contacting the substrate without contacting an adjacent one of the plurality of regions.

29. A method of separating wavelength component signals from
20 a polychromatic optical signal, comprising:

- providing the polychromatic signal at an angle of entry to a light-receiving surface of a stratified body comprising a plurality of regions of optically permisive material each disposed adjacent one another in a side by side relationship, the material in adjacent regions having differing indexes of refraction;
- capturing the wavelength component signals at different respective angles of exit relative to a light-exiting surface of the stratified body.